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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/713,036	11/16/2000	Akitaka Nakayama	001533	3155

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EXAMINER

AHMED, SHAMIM

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 07/05/2002

3

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-3

Office Action Summary

Application N .

09/713,036

Applicant(s)

NAKAYAMA ET AL.

Examiner

Shamim Ahmed

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 November 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 November 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claim 1 is objected to because of the following informalities:

In the line 2, "a outer should be written as "an outer",

In lines 6-7, the phrase "coating the surface of a board coated with a patterning material with a photosensitive film" includes the use of "with a" phrase twice makes the sentence grammatically incorrect. The sentence should be written as "coating the surface of a board coated with a patterning material of a photosensitive film".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 14-16 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the manufacturing steps recited in pages 11-19, does not reasonably provide enablement for "a method for making a multi-layer printed wiring board which is manufactured by a flexible manufacturing system" in claims 14-16. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. The specification recites very specific deposition and etching steps, which are essential in order to make the multi-layer printed wiring board, which makes the claims broader than the enabling disclosure.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 5-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claims 5-13, line 3, the use of a phrase "to be subjected" is indefinite because the phrase "to be" is not a positive limitation. It is suggested that applicants should provide a positive limitation. It is also not clear that the marking step is during or after the formation of the solder resist.

7. Claim 8-13 recites the limitation "the marking ink" in line 9. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-2,14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidt et al (5,134,056) in view of Kono et al (6,346,678).
Schmidt et al disclose a method of manufacturing a printed circuit board, wherein conductive interconnects and plated through hole and solder pads are applied as portions of a printed conductor pattern are formed on a surface of a board (col.2, lines 61-65 and figure 1). Schmidt et al also disclose that after forming the conductive

patterns, a photosensitive solder resist material is coated onto the conductor pattern of the printed circuit board. Schmidt et al teach that a photosensitive film such as photoresist is applied over the entire solder resist and the photoresist is subsequently exposed in the desired regions with the help of a laser beam to form a light shielding mask. Schmidt et al also teach that the solder resist material, which is not exposed due to the light-shielding mask is removed by a stripping process (col.3, lines 3-20, lines 28-col.4, lines 3). Schmidt et al do not explicitly teach that the conductor patterns are formed by photolithography using a laser beam. However, it would have been obvious to one skilled in the art at the time of claimed invention to form the conductor patterns on the board using a photolithographic technique using a laser beam, which is known and conventional as supported by Kono et al. Kono et al teach that a desired conductor patterns are formed utilizing a photolithographic technique using a laser beam, wherein conductor patterns with a higher degree of precision is achieved (col.1, lines 45-54, col.3, lines 25-39). By doing so, one could have a highly reliable circuit board that is free from any unnecessary residue left on the substrate and the conductor patterns with a higher degree of precision is achieved as taught by Kono et al.

10. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidt et al (5,134,056) in view of Kono et al (6,346,678) as applied to claims 1-2, 14-19 above, and further in view of Ohsumi et al (6,001,537).

Modified Schmidt et al discussed above in the paragraph 9 but fail to explicitly teach that the photosensitive solder resist material is exposed by ultraviolet (UV) rays.

However, Ohsumi et al teach that ultraviolet rays are used to expose a photosensitive

material on a surface of a predetermined pattern in order to form a precision pattern (col.5, lines 3-9 and col.6, lines 50-62). By doing so, one could have a superior quality of patterns on a substrate with superior properties of both migration resistance and adhesiveness with the substrate as taught by Ohsumi et al.

11. Claims 5-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidt et al (5,134,056) in view of Kono et al (6,346,678) as applied to claims 1-2 and 14-19 above, and further in view of Shinmoto et al (5,897,938).

Modified Schmidt et al discussed above in the paragraph 9 but fail to teach that the printed circuit board can be mark by utilizing a photosensitive marking material, which can be irradiating by a laser. However, it would have been obvious to one skilled in the art at the time of claimed invention to mark the circuit board by laser marking, which is conventional as supported by Shinmoto et al. Shinmoto et al teach that laser marking method is conventional in various fields including electronic parts, printed circuit board or the like. Shinmoto et al teach that a substrate such as circuit board is marked by coating a photosensitive material over the board and then the photosensitive material is irradiated by a laser beam to form laser- irradiated and laser-unirradiated region (col.1, lines 9-26). By doing so, one could provide a mark on a substrate on real time because the laser marking enables a high-speed fine marking as taught by Shinmoto.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Murakami et al (5,464,662) disclose a method of printed wiring board, wherein solder resist is deposited and selectively exposed; Amago et al

(5,402,314) disclose a printed circuit board having a photo-curable solder resist layer as the solder resist and Demura (5,493,077) disclose a printed wiring board having solder resist film.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (703) 305-1929. The examiner can normally be reached on M-Thu (7:00-5:30) Every Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (703) 308-4333. The fax phone numbers for the organization where this application or proceeding is assigned are (703)-305-7718 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Sa
July 1, 2002

Shamim Ahmed
Examiner
Art Unit 1746


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